National Institute of Electronics and Information Technology, Gorakhpur Centre

A Scientific Body of Dept. of Eectronics and Information Technology, Ministry of Comm. & Information Technology, Govt. of India
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Procurement of Solar Panel System

On behalf of the Director, NIELIT Gorakhpur Quotations are invited from interested parties for the supply and installation of Solar Panel System(Solar street light and Solar Lantern) and Measuring Instruments.The Specifications, terms and conditions are available on NIELIT Gorakhpur website www.nielitgkp.edu.in or www.eprocure.gov.in Last date for receiving of quotations is 05.12.2014 at 3.00 P.M. and tender will be conducted on 05.12.2014 at 4.00 P.M.

Advt. No. NIELIT/Gkp/224/05/2014 **Deputy Director**

NATIONAL INSTITUTE OF ELECTRONICS AND INFORMATION TECHNOLOGY-GORAKHPUR
राष्ट्रीय इलेक्ट्रॉनिकी एवं सूचना प्रोद्योगिकी संस्थान, गोरखपुर
A Scientific Body of Dept. of Eectronics and Information Technology,
Ministry of Comm. & Information Technology, Govt. of India
(इलेक्ट्रॉनिकी एवं सूचना प्रौद्योगिकी विभाग, संचार एवं सूचना प्रौद्योगिकी मंत्रालय, भारत सरकार की एक स्वायत्त वैज्ञानिक संस्था)
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CDS/GP/7.4.1/F08/R0

Ref. No.: NIELIT/GKP/224/ 11/14-15 Date: 14.11.2014
फाईल संख्या.: नाइलिट /गो//224/ दिनॉक:

NOTICE INVITING TENDER

(Date of opening/ खोलने का तारीख :05-12-2014 at 0400 PM)

To/ सेवा में,

C P P Portal

Dear Sir,

You are requested to quote rate (s) for the items mentioned below as per the specifications given below:
आप द्वारा निम्न विवरण के अनुसार निविदा आमंत्रित किया जाता है :

Sl.no. **क0सं0**	Name of the Item(s) **Description/Specification** **सामानों का नाम विवरण एवं विशिष्टियॉ**	**Qty.** **मात्रा**	**Unit** **इकाई**
	SOLAR PANEL SYSTEM		
01	Solar Power Plant 1KWp : (Specification as per enclosed Annexure-1)	01.	No
02	Solar Street Light : (Specification as per enclosed Annexure-2)	01	No.
03	Solar Lantern : (Specification as per enclosed Annexure-3)	01	No.

The Terms & Conditions should be read carefully and noted in order to comply with.
पीछे दी गई नियम व शर्तो को ध्यानपूर्वक अनुपालन सुनिशिचित करें ।

Yours faithfully,
भवदीय

For NIELIT-GORAKHPUR
एन.आई.ई.एल.आई.टी. सोसायटी – गोरखपुर के लिए
Authorised Signatory

TERMS AND CONDITIONS
Supply and Installation of SOLAR PANEL SYSTEM

(Tender Enquiry No. : NIELIT/GKP/224/11/14-15)
Date of Tender opening: 05.12.2014 at 0400 PM

This tender notice shall be governed by following terms & conditions:

1. The reference No. and date must be superscribed on the sealed tender envelope failing which it will not be considered.
2. The tender should reach **NIELIT, Gorakhpur** on or before **03.00** p.m. of **05.12.2014** The tenders received late shall not be considered.
3. Tender will be opened at **04.00** p.m. on **05.12.2014** at NIELIT, Gorakhpur in presence of bidders, present if any. Tenders received late shall not be considered.
4. The tender will be acceptable only from certified original Manufactures or their authorized dealers/distributors. Copy of sole distributorship/Authorized dealership Certificate from manufacturing principals should accompany the technical bid otherwise tender shall be rejected.
5. Delivery/installation period and schedule of installation of system should be mentioned in the bid. The delivery of items and installation to be completed within stipulated period from date of award of P.O./ signing of contract. In case of any delay in delivery/installation after delivery/installation period, not exceeding 30 days, a penalty @ 1.0% per week of the ordered amount shall be imposed. Beyond 30 days of delivery/installation period the purchase order may be treated as cancelled by the Director, NIELIT, Gorakhpur, and E.M.D. shall be confiscated.
6. Delivery period / execution period of work shall be maximum 06 weeks from the date of release of L.O.I / Purchase order unless otherwise specified.
7. The rates quoted should be F.O.R. NIELIT, Gorakhpur, and should be inclusive of freight/ packing/forwarding charges, loading, unloading, installation, commissioning and testing complete.
8. Concessional Forms like C/D shall not be issued.
9. Complete printed literature for the items quoted should accompany the quotation, in absence of which the quotation may not be considered.
10. Copy of Income Tax Clearance Certificate with PAN No., proof of Sales Tax Registration/ and Experience Certificate of at least three works/supply of similar nature of item from appropriate Authority should accompany the bid, other wise, tender shall be rejected.
11. Quotation with overwriting, alternations will not be considered. Only typed quotations will be accepted.
12. The rates quoted have to be valid up to 6 months from the last date of submission of tender.
13. NIELIT, Gorakhpur Centre shall be under no obligation to accept the lowest quotation.
14. Supplies not as per order or as per specifications will be rejected and returned at the cost of supplier and the EMD will be confiscated.
15. The bidder will be required to **furnish earnest money worth Rs 1,000/-** to be placed in the bid envelope, in the shape of crossed Demand Draft in favour of Director NIELIT, Gorakhpur which will be refundable within three months after completion of supply as per the purchase order and inspection, if order is awarded or within one month of finalization of order if order is not awarded or if tender is rejected. Without the earnest money the tender shall be out rightly rejected. Earnest money of suppliers to whom work is awarded shall be kept as security deposit till total supply as ordered is executed and it may be forfeited in case of (i) non compliance of contract/supply order(ii) incomplete supply (iii) material not supplied as per specifications.
16. Excise duty as applicable shall be paid extra against Excise Gate Pass in original. If applicable, it should be mentioned clearly in the tender.
17. Octroi and other incidentals will be paid by the suppliers.
18. Proforma invoice/bill should bear the Income Tax number and Sales Tax number /VAT/ TIN, etc
19. The Centre will pay 90% of the amount after successful execution of supply order which includes installation

and operation of the Solar Panel System. Further operational training, if any, to our personnel has to be provided by the Suppliers free of cost. Remaining 10% will be paid after one month of the satisfactory performance against Bank Guarantee for 10% of the bill value which shall have to be valid up to warranty period.

20. **Warranty period must be mentioned in quotation.**
21. Items damaged in transit will have to be replaced by the supplier at his own cost.
22. The rates will be considered F.O.R. NIELIT, Gorakhpur Centre even if it is not mentioned in the quotation.
23. It will be binding on the part of the successful bidder to supply the goods at the quoted rates failing which the name of the firm will be removed from the suppliers list and no further enquiries would be sent. Other relevant terms and conditions of this tender would also be made applicable automatically.
24. Repeat order, if necessary, will be placed within 6 months from the date of issue of purchase order and has to be executed by the supplier.
25. In case of any dispute on account of deviation of the terms and conditions, the responsibility will be of suppliers and the decision of the Director NIELIT, Gorakhpur shall be binding and final.
26. Two copies of service manual/operation manual/ user manual shall have to be supplied along with item free of cost.
27. The Earnest Money Deposit will be refunded to the unsuccessful bidders after declaration of the successful bidder and subsequent conclusion of the Contract.
28. The firm submitting the bid should be registered with the concerned State for Sales Tax /CST/VAT/TIN.
29. Proprietary Certificate should accompany in case of proprietary item, if any.
30. Details of the Taxes as applicable should be mentioned in the quotation clearly. In case of any ambiguity, prices will be considered as inclusive of all taxes.
31. All disputes lie within the jurisdiction of Gorakhpur courts.
32. The quantity of items advertised is likely to be increased or decreased or any item/items may be deleted.
33. The facility of after-sales-service must be clearly indicated along with its location. During warranty period if servicing support is not provided within 7 days, a penalty of 1% of item value per week will be imposed and recovered from bank guarantee, and NIELIT, Gorakhpur, will have the right to arrange repair/replacements at the cost and risk of the bidder.
34. The detailed specifications, warranty details of the goods are as per annexure(s) attached.
35. The bidder must bring the sample for evaluation /acceptance as and when asked for. A notice of not more than 15 days would be given.
36. No quotation will be accepted by fax, e-mail, telex, or any other such means.
37. The Tender is likely to be rejected because of non-fulfillment of any of the above terms.
38. The Director, NIELIT, Gorakhpur, reserves the right to reject all or any tender without assigning any reason thereof.
39. Conditional tenders may be rejected.
40. **Subsidy if available it should be mentioned clearly and same should be arranged by supplier.**

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Annexure - 1

Specification of 1.0 KW SPV Power Plant

Technical Specifications

ITEM	DESCRIPTION
SPV Module	• The photovoltaic modules should be Mono /Poly Crystalline with a total array capacity of 1.0 KW. Stand Alone Solar Power Plant to feed the generated solar power to the load and provide necessary backup to 1KVA load for 6 hours operation. MPPT power control Technology for maximizing solar panel output • The photovoltaic modules should be a branded one. The Photovoltaic modules must be qualified as per IEC **61215 (revised) / IS 14286 standards, UL 1703, CEC** and in addition, the modules must conform to IEC 61730-1 requirements for construction & Part-2 requirements for testing, for safety qualification. • The PV modules must have been approved from any of the NABL/BIS/ MNRE Accredited Testing Calibration Laboratories. Attach copies of certificates • The supplier shall provide performance guarantee for the PV modules used in the power plant and must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.
No's of Modules	4 to 6 Nos. each of minimum 180 Wp or above wattage. Module capacity less than 180 watts will not be accepted. Necessary I-V curves of the SPV Modules are required to be furnished.
Nominal Capacity	1KW. Photo voltaic module should be adjustable minimum 3 steps for sun directional adjustment.
System autonomy	1+2 day
Battery Bank	• VRLA tubular GEL type batteries conforming to National / international standards **IEC-61427 & IS-1651 /IS 13369 standards**, low maintenance, stationery at C/10 rate). • The batteries of 2 Volt, 300Ah Cells will be connected in series/ parallel to form 24 volt 300 Ah battery bank. • It will be staged in racks duly painted with acid resistant paint to cover less space.

Power Conditioning Unit	Power conditioner unit of **capacity minimum 1.0 KW** should convert DC power in to AC power must confirm to standards **IEC 61683** for efficiency. A 24 volt DC to 230 volt AC inverter will have following features: • MOSFET based PWM Sine Wave. • Wide input voltage range • Output voltage 230 ± 2% • Out frequency: 50 Hz±0.5 Hz • Efficiency: > 90% at full load • Load power factor: 0.8 lagging to unity. • Ambient temperature: 0-50 deg. Cent • Relative humidity: 90% Non-condensing • Protections: - Over voltage (automatic shut down) - Under voltage (automatic shut down) - Overload - Short circuit (circuit breaker & electronics protection against sustained fault).

	• Indications: - Battery low - Overload - Inverter ON - Input &output voltage - Input & output current - Frequency - Power output • Cooling: Air cooled In case some manufacturer has different input voltage of PCU i.e.24V, 48Volt and 96 Volt then the PCU should be able to deliver out put of 230 Volt 50 Hz AC irrespective of what DC voltage input they are feeding to the PCU. The Charge Controller shall be according to the system voltage selected for the PCU.

SPV Charge Controller	A suitable SPV charge controller having following features, specifications be provided • MPPT /pulse width modulation (PWM) charge controller • Both calibrated scales and test points to allow precise adjustments and setting verification • Electronics protection for - Short circuit - Overload - Over temperature - Reverse polarity • Auto resetting electronic over current protection • LCD Digital display with back lighting and continue display of - Battery voltage - DC Current - Cumulative AH - Separating resettable "trip" AH measurement - Integrated charge controller and Invertor will be preferred.
Junction boxes	• The junction boxes shall be dust and water proof and made of thermoplastic the terminals will be connected to copper lugs or bus-bar of proper sizes. The junction boxes will have suitable cable entry points fitted with the cables. Suitable markings shall be provided on the lugs or bus-bars for easy identification at cable ferrules will be fitted at the cable terminations points for identification. Each main junction box shall be fitted with appropriate rating reverse blocking diode. The junction boxes shall be of reputed make. • The junction boxes shall have suitable arrangement for the following: a) Combine groups of modules into independent charging sub-arrays that will be wired into the controller. b) Provide arrangement for disconnection for each of the groups. c) Provide a test point for each sub group for quick fault location. d) To provide group array isolation. e) The rating of the JBS shall be suitable with adequate safety factor to inter connect the Solar PV array.
Structure for module frame	Modules shall be mounted on supporting structure made out of galvanized MS angle of required structural strength. (hot dip/galvanized) either on the roof top or at ground as per the site requirement Structure : - 1. The size of M.S. (Galvanized) angle should be 50 x 50 x 6 mm. The structures are to be fitted either on the roof top or at ground properly and south faced. It should withstand wind speed up to 200 Km/hour.

	2. Foundation – The legs of the structure made with hot dip GI angles will be fixed and grouted in the RCC foundation columns of size 300mmx300mm made with 1:2:4 cement concrete. The minimum ground clearance from the lowest part of any module shall be 500 MM. While making foundation design due consideration will be given to wait of module assembly, maximum wind speed of 200 km per hour. 3. The work includes necessary excavation, concreting, back feeling, shoring and shuttering etc. 4. Brick paving of first class bricks with cement mortar (1:6) as per PWD specifications on edge type plate form is to be provided under the modules structure area with minimum 1 meter more than structure.
Connecting cables	PVC insulated copper cables (ISI marked) for : • Module interconnections (4.0 mm^2 copper single core multi strand) • Module parallel interconnection (10mm^2 copper single core multi strand) • Array or AJB to charge controller (16 mm^2 copper two cores). • Charge controller to battery (16 mm^2 copper two core multi strand) • Battery to PCU (16 mm^2 copper single core multi strand) might be double cables if required • PCU to load / change over (Single core copper cable 6.0 mm^2 multi strand) and for further distribution points (Single core copper cable 4.0 mm^2 and 2.5 mm^2 multi strand) - All cables to be supplied should be as per BIS and should have proper current carrying capacity and should not be heated. - All cables shall be adequately supported. - Outside of terminal/panels/enclosures shall be protected by conduits. Cables shall be provided with dry type compression glands wherever they enter junction boxes, panels, enclosures.
Indoor wiring	All indoor wiring is to be done in a casing capping system. As and when required flexible pipe may also be used.
Lighting protection	Suitable nos. of lighting arrestors shall be provided in the array field.
Earthing protection	Each array structure and all metal casings of the plant etc. shall be earthed properly.
Tool Kit and Spares	One necessary tools kit and spares will have to be provided by the supplier which should have compulsory one RFID Tag Meter so as to read the RFID Tag of SPV modules supplied.
Display/Monitoring	AC Metering Box and DC monitoring Box

CODES AND STANDARDS

The BOS items/components of the SPV power plant must conform to the latest edition of IEC/equivalent BIS Standards as specified below:

BOS Item/Component	Standard Description	Standard Number
Power Conditioning Unit Inerter	Efficiency Measurements Environmental Testing	IEC61683 and must additionally conform to the relevant national/international Electrical Safety Standards IEC 60068 2 (6,21,27,30,75,78)
Charge Controller/MPPT Unit	Design Qualification Environmental Testing	IEC 62093 IEC 60068 2 (6,,21,27,30,75,78
Storage Batteries	General Requirements & Methods of Test Tubular type.	IEC 61427 IS 1651.IS 13369
Cables	General Test and Measuring Methods PVC insulated cables for working voltages up to and including 280 V, UV resistant for outdoor installation	ISE 60189 IS 694/IS 1554 IS IEC 69947
Switches/Circuit Breakers/Connectors	General Requirements Connectors-safety	IS/IEC 60947 part I, II& III EN 50521
Junction Boxes. Enclosures	General requirements	IP 65 (for outdoor) IP 21 (for indoor) IEC 62208
SPV System Design	PV Stand-alone systems design verification	IEC 62124
Installation Practices	Electrical Installations of buildings requirements for SPV power supply systems	IEC 60364-7-712

Must additionally conform to the relevant national/ international electrical Safety Standards.

INDENTIFICATION AND TRACEABILITY

Each PV modules used must use a RF identification tag (RFID), which must contain the following information. The RFID can be inside or outside the module laminate, but must be able to withstand harsh environmental conditions.

1. Name of the Manufacturer of PV Modules
2. Name of the manufacturer of solar Cells
3. Month and year of the manufacturer (separately for solar cells and module)
4. Country of origin (separately for solar cells and module)
5. I-V curve for the module
6. Peak Wattage, Im VM and FF for the module
7. Unique serial No and Model No of the module
8. Date and year or obtaining IEC PV module qualification certificate
9. Name of the test lab issuing IFC certificate
10. Other relevant information on traceability of solar cells and module as per ISO 9000 series.

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Annexure - 2

Specification for White LED based Solar Street Lighting System – 1Nos

A solar photovoltaic Street Lighting System is an outdoor lighting unit used for illuminating a road etc. This system comprises of solar photovoltaic (SPV) module, a luminaire, storage battery, control electronics, interconnecting wires/cables, module mounting pole including hardware and battery box. The luminaire is based on White Light Emitting Diode (W-LED). The control electronics (including charge controller and LED driver) fixed inside a luminaire is mounted on the pole at a suitable angle to maximize illumination on the ground. The PV module is to be fixed on the pole at an angle facing south, so that it receives solar radiation throughout the day, without any shadow falling on it. The battery is placed in a box and attached to the pole. Electricity generated by the PV module charges the battery during the day time which powers the luminaire from dusk to dawn. The system lights at dusk and switches off at dawn automatically.

Light source	White Light Emitting Diode (W-LED) 9 Watt
LED Efficacy (lumens /Watt)	Minimum 140 lumens / watt @ 350mA
Lumens output of luminaire	1000 – 1300 lumens minimum
Duty cycle	8 to 12 hours/Day
Autonomy	2 days
Beam angle	120 ˚
Boom angle	10˚
Light Output	Min 15 lux on ground from 4 meters height & 10 lux @ dimming
Battery	Li-ion 11.2 V, 20 AH or Lead acid SMF 75 AH
DOD	75%
PV module capacity	75 W
Luminaire IP rating	IP 65
Operating Temp.	(-20 to 50 deg Centigrade)
Humidity	10 to 90 %RH
Protection	Battery overcharge, deep discharge, SPV Module Reverse Polarity, Open Circuit
Indications	Green—Battery Charging Indication Red—Battery deep charge condition

PV MODULE

I. The PV module should have crystalline silicon solar cells and must have a certificate of testing conforming to IEC 61215 Edition II / BIS 14286 from an NABL or IECQ accredited Laboratory.
II. The power output of the module(s) under STC should be a minimum of 75Wp at a load voltage* of 16.4 ± 0.2 V.
III. The open circuit voltage* of the PV modules under STC should be at least 21.0 Volts.
IV. The module efficiency should not be less than 14 %.

V. The terminal box on the module should have a provision for opening it for replacing the cable, if required.
VIII. PV Junction box: IP 65
IX. The PV module must use a RF Identification tag (RFID), which must contain the following information:

i. Name of the manufacturer of PV Module
ii. Model or Type Number
iii. Serial Number
iv. Month and year of the manufacture
v. I-V curve for the module
vi. Peak Wattage of the module at 16.4 volts
vii. Im, Vm and FF for the module
viii. Unique Serial No and Model No of the module

The RFID can be inside or outside the module laminate, but must be able to withstand harsh environmental conditions.

*The load voltage and Voc conditions of the PV modules are not applicable for the system having MPPT based charge controller

BATTERY

I. Li-Ion battery.
II. The battery will have a minimum rating of 11.1 V, 20 Ah at C/10 discharge rate or 12V, 75AH.
III. 75 % of the rated capacity of the battery should be between fully charged and load cut off conditions.
IV. Battery should conform to the latest BIS/ International standards.
V. Battery needs to be housed with proper ventilation.
VI. Protection: Temperature compensated charging for battery

LIGHT SOURCE

I. 9 W LED light source with fixture along with proper heat sink to dissipate heat generated by LEDs.
II. The light source will be of white LED type
III. The colour temperature of W-LEDs used in the system should be in the range of 5500 K–6500 K
IV. LEDs should not emit ultraviolet light.
V. The lamp should be housed in an assembly suitable for outdoor use, with a reflector on its back.
VI. To be certified in complying with LM 80 standards.

ELECTRONIC PROTECTIONS

I. Adequate protection is to be incorporated under “No Load” conditions e.g.when the lamp is removed and the system is switched ON.
II. The system should have protection against battery overcharge and deep discharge conditions.
III. Fuse should be provided to protect against short circuit conditions.
IV. Protection for reverse flow of current through the PV module(s) should be provided.
V. Electronics should have temperature compensation for proper charging of the battery through out the year.
VI. Adequate protection should be provided against battery reverse polarity.
VII. Load reconnect should be provided at 80% of the battery capacity status

MECHANICAL COMPONENTS

I. A corrosion resistant metallic frame structure should be fixed on the pole to hold the SPV module.
II. The frame structure should have provision to adjust its angle of inclination to the horizontal between 0 and 45, so that the module can be oriented at the specified tilt angle.
III. The pole should be made of Galvanised Iron (GI) pipe / as per IS standards.
IV. The height of the pole should be 4 metres above the ground level, after grouting and final installation.
V. Module mounting pole including Single fixture along with the mounting arrangement and the solar panel the integrated solar street light can be installed directly out of the box.
VI. The lamp housing should be IP 65 and should be painted with a corrosion resistant paint.

INDICATORS

I. The system should have two indicators, green and red.
II. The green indicator should indicate the charging under progress and should glow only when the charging is taking place. It should stop glowing when the
battery is fully charged.
III. Red indicator should indicate the battery “Load Cut Off” condition.

CIVIL

I. Pole should be properly concreted with M16 or M20 grade.
II. Pole foundation to be laid with minimum 0.5 meter inside the ground

QUALITY AND WARRANTY

I. All the components and parts used in the solar street lighting systems should conform to the latest BIS or IEC specifications, wherever such specifications are available and applicable.

II. The street lighting system including the battery will be warranted for a period of 3 years from the date of commissioning.
III. The PV module(s) will be warranted for a minimum period of 25 years from the date of supply. The PV modules must be warranted for their output peak watt capacity, which should not be less than 90% at the end of Ten (10) years and 80% at the end of Twenty five (25) years.
IV. The Warranty Card to be supplied with the system must contain the details of the system.
V. Standards to be complied: IEC 61215 : Solar panel, EN 50530 : MPPT performance, IEC 62124 : Solar standalone system performance, IEC 61347- 213: LED driver safety, IEC 62384 : LED driver performance, IEC 61547 : EMC immunity requirements
VI. Tests : Type test certificates to be enclosed for all the above standards
(Enclose compliance certificate along with invoices for processing of payments)

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Annexure – 3

Technical Specification for Solar Lantern - 1Nos.

The Charging stations should have following model configuration.

Solar Lantern (10Wp module, 12V, 7AH Lead acid battery SMF or 6V, 4.5AH Ni MH or Lithium Ion and 3watt minimum LED)

Specification of LED based lanterns

DEFINITION

Light Emitting Diode (LED) is a device which emits light when an electric current passes through it. A Solar lantern is a lighting system consisting of a lamp, battery and electronics, all placed in a suitable housing, made of metal, plastic or fiber glass, and a PV module. The battery is charged by electricity generated through the PV module. The lantern is basically a portable lighting device suitable for either indoor or outdoor lighting, covering a full range of 360 degrees. A LED based solar lantern system aims at providing solar electricity for operating LED lights for specified hours of operation per day. The broad performance specifications of a white Light Emitting Diode (LED) light source based solar lantern system are given below.

Sl. No.	Distance	When detector is in horizontal to center point of bottom of light source	When detector is at right angle to the center point of bottom of light source
1	1 feet	32 Lux	105 Lux
2	2 feet	6.5 Lux	32 Lux
3	3 feet	3.0 Lux	16 Lux
4	4 feet	2.0 Lux	9.5 Lux
5	5 feet	1.5 Lux	6.5 Lux

Mounting of light : Top or base mounted
PV Module: 10Wp under STC
Battery: Ni MH or Lithium Ion, 6V, 4.5AH or Lead acid SMF with a capacity upto - 7 AH, 12 V @ C/20,
Max DoD: 75% or equivalent capacity
Electronics: Min 80% total efficiency
Average duty cycle: 4 hours a day
Autonomy: Minimum of 3 days (Minimum 14 operating hours per permissible discharge)

DUTY CYCLE

The LED solar lantern system should be designed to operate for average 4 hours a day, under average daily insolation of 5.5 kWh /sq.m. on a horizontal surface.

LIGHT SOURCE

The light source will be of white LED type. Single lamp or multiple lamps can be used. Wider view angles preferred. The luminous performance of LEDs used should not be less than 100 lumen/watt. White colour, Higher light output will be preferred. The colour temperature of white LEDs used in the system should be in the range of 5500 ° K – 6500 °K. Use of LEDs which emit ultraviolet light is not permitted.

The light output from the white LED light source should be constant though out the duty cycle. The lamps should be housed in an assembly suitable for indoor and outdoor use.
The make, model number, country of origin and technical characteristics of white LEDs used in the lighting system must be furnished along with the certificate of test for lux output at different distance to the buyers.

BATTERY

(i) Sealed maintenance free battery. Battery should conform to latest BIS standards or international standards. A copy of the test certificate for the battery (including its make, country of origin and model number) used in the system should be provided.

(ii) At least 75 % of the rated capacity of the battery should be between fully charged & load cut off conditions.

Others

i) The light output should remain constant with variations in the battery voltages.
(ii) Necessary lengths of wires / cables, switches suitable for DC use and fuses should be provided.

PV MODULE

The PV modules based on crystalline silicon solar cell. In all cases a test report is required from authorized test center. The power out put of the PV module must be reported under standard test conditions (STC) at loading voltage. I_V curve of the sample module should be submitted to the buyer. The open circuit voltage of the PV modules under STC should be at least 18 Volts.

The terminal box on the module should have a provision for opening for replacing the cable, if required.

A strip containing the following details should be laminated inside the module so as to be clearly visible from the front side:

a) Name of the Manufacturer or distinctive Logo
b) Model or Type No.
c) Serial No.
d) Year of make

ELECTRONIC PROTECTIONS

Adequate protection is to be incorporated under no load conditions, e.g. when the lamps are removed and the system is switched ON.

The system should have protection against battery overcharge and deep discharge conditions. The numerical values of the cut off limits must be specified, while submitting the samples for the testing purposes.

Fuses should be provided to protect against short circuit conditions.

A blocking diode should be provided as part of the electronics, to prevent reverse flow of current through the PV module(s), in case if such diode is not provided with the PV module.

Full protection against open circuit, accidental short circuit and reverse polarity should be provided.

OTHER FEATURES

(i) The system should be provided with 2 LED indicators: a green light to indicate charging in progress and a red LED to indicate deep discharge condition of the battery. The green LED should glow only when the battery is actually being charged.

(ii) There will be a Name Plate on the system body which will give:

Name of the Manufacturer or Distinctive Logo.
Model Number
Serial Number
Year of manufacture

QUALITY AND WARRANTY

(iii) Components and parts used in White LED solar lantern systems should conform to the latest BIS / international specifications, wherever such specifications are available and applicable. A copy of the test report / certificate stating conformity of BIS / international standards must be submitted to the buyer.

(iv) The PV module will be warranted for a minimum period of 15 years from the date of supply and the White LED solar lantern system (excluding the battery) will be warranted for a period of at least 5 years from the date of supply. The battery should be warranted for a period of at least two year.

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